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PAKISTANI MISSILES: EXPLAINING PROCUREMENT AND STRATEGIC IMPLICATIONS

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Abstract

Pakistan, starting a missile development programme in the 1980s, is a significant missile force today. Its missile arsenal is composed of varied types of short and medium-range ballistic and cruise missile systems. They are both solid and liquid propellant and can carry conventional as well as non-conventional ammunitions. This paper analyses Pakistan's missile procurement approach and strategic implications of Pakistani missiles. While the Pakistani missile programme was initiated as a corollary to its nuclear weapons programme, yet the strongest impetus for building a missile force came from its chief strategic rival, India. In building its missile capabilities, Pakistan had to overcome severe international constraints and relied heavily on clandestine procurement of appropriate technologies. The Pakistani missiles may be viewed to have strengthened Pakistani deterrent capability and has contributed to strategic stability between itself and India.

Introduction

Since the World War II, the trend of missile proliferation, in terms of increasing sophistication and the number of countries acquiring them, has been fairly consistent. In recent decades, missile systems have proliferated not only in the developed world but also in many developing

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countries.[1] The primary reason for this consistent missile proliferation in the post-war era is that missiles, in particular ballistic missiles, are more efficient and secure means of delivering conventional as well as non-conventional munitions than the traditional means of aircrafts. And, of course, the acquisition of missile capability enhances the credibility of a state's military power.

Two interesting points arise from missile proliferation in the developing world. First, developing countries in general lack advanced technologies; how do they build considerably sophisticated missile capabilities is, therefore, a moot question. A perspective in this regard can be found in what the Iranian intellectuals call as 'Pakistan Syndrome', meaning 'a state that has failed along many dimensions but still can do one thing well – build a nuclear bomb'.[2] Second, although missile proliferation ostensibly appears to be benign, it does not, however, mean that their spread is devoid of any implication. In fact, acquisition of missile capabilities by a state does make profound strategic impact on a given region.

These two issues are examined in this paper in the context of Pakistan. Indeed, Pakistan is an interesting case because vital lessons can be learnt from it regarding the process of missile proliferation as well as strategic implications of their spread in the developing world. This paper is divided into three sections. In the first section, it provides an inventory of Pakistani missiles. The second section analyses the rationale and the history of Pakistan's acquisition of missile capabilities. Finally, it provides an in-depth analysis of strategic implications of Pakistani missiles.

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[1] For a general overview of missile proliferation in the developing world, see, Martin Navias, *Ballistic Missile Proliferation in the Third World*, Adelphi Paper, No. 252, (London: International Institute for Strategic Studies, Summer 1990); Jane E. Nolan, *Trappings of Power: Ballistic Missiles in the Third World*, (Washington D.C.: Brookings Institution Press, 1991); Aaron Karp, *Ballistic Missile Proliferation: The Politics and Technics*, (Oxford: Oxford University Press, 1996); *Ballistic Missile Proliferation: Jane's Special Report*, (Geopolitical), Jane's Information Group, February 2000.

[2] Stephen Philip Cohen, *The Idea of Pakistan*, (Washington, D.C.: Brookings Institution Press, 2004), p.330.

Missile Capabilities of Pakistan: An Inventory

Pakistan's missile arsenal is composed of varied types of short and medium-range ballistic missile systems. They are both solid and liquid propellant and can carry conventional as well as non-conventional ammunitions. To be precise, Pakistan's capabilities include the solid-fuelled *Hatf* battlefield missile series, the liquid-fuelled *Ghauri* intermediate-range ballistic missiles, and the solid-propellant *Shaheen* series. Pakistan recently has developed its first cruise missile system the *Babar*. Additionally, Pakistan possesses several dozens of M-11 missiles, which Beijing supplied to Pakistan in the early 1990s.

Table 1: Pakistan's Missile Capabilities: Missile System Type First Test Range/km Payload/kg Fuel

Hatf-I	BRBM	Early 1989	50-90	450	Solid (Single Stage)
Hatf-II/ Abdali	BRBM	Early 1989	70-200	450	Solid
Hatf-III Ghaznavi	SRBM	26 May 2002	100-290	800	Solid
Hatf-IV /Shaheen-I	IRBM	15 April 1999	200-650	850	Solid
Hatf-V /Ghauri-I	IRBM	6 April 1998	300-1300	680	Liquid
Hatf-VI /Shaheen-II	IRBM	9 March 2004	700-2200	1100	Solid
Hatf-VI /Shaheen-II	IRBM	14 April 1999	1800	1500	Liquid
M-11	SRBM		280-300	800-1200	Solid
Hatf-VII /Babar	SRSCM	12 August 2005	500		
Hatf-VIII /Raad	ALCM	25 August 2007	350		

Sources: International Institute for Strategic Studies, *Nuclear Black Markets: Pakistan, A.Q. Khan and the rise of proliferation networks: A net assessment* (London: IISS, 2007); Major General (Retd.) Mahmud Ali Durrani, *Pakistan's Strategic Thinking and the Role of Nuclear Weapons*, Cooperative Monitoring Center Occasional Paper, SAND 2004 3375P, Sandia National Laboratories, July 2004; *Jane's Strategic Weapons Systems*, (Issue 39, July 2002), pp. 124-131, http://www.pakistanidefence.com/Nuclear&Missiles/Pakistani_Ballistic_Missiles.html

The News (Rawalpindi), 25 August 2007.

Hatf-I

The original variant of *Hatf-I* was a single-stage, solid-fuelled *rocket*, which had a range of 50-90 km, and could carry 450 kg payload ordnance.[3] It was first tested in early 1989, but its accuracy remains unknown and is strongly suspected. It is also very doubtful whether the original variant of *Hatf-I* could actually carry a nuclear warhead. It is more likely that it was intended to carry high explosives, sub-munitions, and possibly chemical weapons.[4] After its first test, *Hatf-I* went into oblivion for a long period of time, and only came back to the limelight when a modified variant, of about 100 km range, was test-fired in February 2000.[5] There is no clear explanation from the Pakistani authorities why it was kept dormant for such an extended period of time, or why it reappeared. A plausible explanation for reviving *Hatf-I* missile is, perhaps, due to the necessity of a tactical delivery vehicle that was specifically felt in view of the experience of the 1999 Kargil War. Islamabad is widely believed to have received Chinese technical assistance in developing this missile in the 1980s. This missile system has already been deployed and Pakistan probably currently possesses as many as 80 *Hatf-I* missiles.[6]

Hatf-II/Abdali

It is a two-stage, solid-fuelled ballistic missile system, which has a 70-200 km range and can carry a 450 kg payload munitions.[7] Its first test took place in early 1989 simultaneously with *Hatf-I*. Pakistan, like *Hatf-*

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[3] "Hatf-1 – Pakistan Missile Special Weapons Delivery Systems", *Federation of American Scientists*, available at http://www.fas.org/nuke/guide/pakistan/missile/hatfp1.htm. It is noteworthy that a rocket differs from a missile system in the sense that the former does not have guidance system and relies on its launch trajectory in order to hit the intended target.

[4] *Jane's Strategic Weapons Systems*, (Issue 37, July 2002), pp.124-131.

[5] Ben Sheppard, "Ballistic Missiles in South Asia: The Ramifications for Regional Stability", Brookings Institution, available at www.brookings.edu/fp/projects/south_asia/events/20010405.htm

[6] International Institute for Strategic Studies, *The Military Balance 2002-2003*, (London: IISS, 2002), p. 133.

[7] "Hatf-II – Pakistan Missile Special Weapons Delivery Systems", *Federation of American Scientists*, 19 June 2003, available at http://www.fas.org/nuke/guide/pakistan/missile/hatf-2.htm

I, is believed to have received Chinese technical assistance to develop this missile system. *Jane's Defence Weekly* reported that Pakistani officials had admitted the Chinese assistance to the Pakistani missile development programme and specifically mentioned of Chinese help in developing the guidance system of *Hatf-I* and *Hatf-II*.[8] After its first test in 1989, nothing was heard about *Hatf-II* until the project was revived in 1997. There is no explanation from the Pakistani government as to why the project was suspended and later revived. A number of reasons can be inferred for the suspension of the *Hatf-II* project. One probable reason is that the project suffered technical difficulties, which forced Islamabad to suspend it. Another reason could be that it was merged with another project. Or it could even be that the project was abandoned, as this missile resembled the M-11 missile system, which China supplied to Pakistan in the early 1990s.[9] The project was revived in 1997, probably considering its potential use as a battlefield delivery system. A new variant of Hatf-II was developed upon the project's renewal, which was

[8] Mushahid Hussain, "First Sight of Pakistan's 'Lance', *Jane's Defence Weekly*, (vol. 11, No. 10, 11 March 1989), p.381; Joseph Cirincione, *Deadly Arsenal: Tracking Weapons of Mass Destruction*, (Washington, D.C.: Carnegie Endowment for International Peace, 2002), p. 213.

[9] In the summer of 1996 press reports in the U.S. based on leaked U.S. National Intelligence Estimate suggested that Pakistan had obtained about three dozens of M-11 missile from China. See, Bill Gertz, "Pakistan Deploys Chinese Missiles", *Washington Times*, 12 June, 1996; R. R. Jeffrey Smith, "Report Cites China-Pakistan Missile Links", *Washington Post*, 13 June 1996. For the full version of the National Intelligence Estimate, see, Carnegie Endowment for International Peace home page available at http://www.ceip.org/programs/npp/brief213.htm China's ambassador to the United States, while not specifying the M-11, acknowledged in an address to the National Press Club, Washington, D.C., that China had given a limited number of ballistic missiles to Pakistan, quoted in Shirin M. Mazari, "Missile Development in India and Pakistan: Impact on Regional Stability", *Security and Economic Review*, (vol. 1, no. 1, 1992), p.14. For more discussion on Pakistan-China links relating to missile and missile technology, see, Rodney W. Jones and Mark G. McDonough, *Tracking Nuclear Proliferation: A Guide in Maps and Charts, 1998*, (Washington, D.C.: Carnegie Endowment for International Peace, 1998); Nayan Chanda *et. al*., "The Race Is On", *Far Eastern Economic Review*, (vol. 161, no. 24, 11 June 1998), pp. 20-22; "CIA Says China Helped Pakistan Missile Program," *The New York Times*, 9 August 2000.

tested on 28 May 2002. Pakistan conducted a series of tests of this missile in 2003, 2005 and 2006.

This missile system is generally considered to be substantively accurate. Hence it can be used against specific targets such as military bases, airfields, etc. It is carried on a road mobile Transporter-Erector-Launcher (TEL) vehicle. The use of solid propellant and the TEL vehicle make the missile easy to store, transport, and launch. Given this characteristic of this missile system, its potential use as a tactical weapon in a limited war context is enormous. Islamabad has already deployed *Hatf-II* missiles.

Hatf-III/Ghaznavi

Hatf-III is a solid-fuel, single-stage ballistic missile which has a maximum range of 290 km and is capable of carrying an 800 kg payload. It can deliver both conventional ordnance as well as nuclear warhead. It was first tested on 26 May 2002.[10] This system closely resembles the Chinese M-9 missile.[11] *Ghaznavi* missiles have formally been inducted into the Army's Strategic Forces Command in February 2004.

Hatf-IV/Shaheen-I

It is a solid-fuelled, road mobile missile system, which has a maximum range of 650 km, and is capable of carrying an 850 kg payload warhead. It is widely believed to be a scaled-up version of China's M-11 missile.[12] *Shaheen* missile system is developed in the National

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[10] Although Pakistani officials claimed the 2002 test to be the first test of *Hatf-III*, *The Nation* in 1997 reported that a *Hatf-III* test had taken place. See, "Hataf III Test", *The Nation*, 6 July 1997. It is not very clear whether the 2002 variant was an improved version of the 1997 *Hatf-III*.

[11] CRS Report, "Missile Survey: Ballistic and Cruise Missiles of Selected Countries", 26 July 2005, p. 20; available at http://www.fas.org/sgp/crs/weapons/RL30427.pdf

[12] In late August 1996 intelligence finding in the U.S. was leaked to the press which said that using blueprints and equipment supplied by China, Pakistan in late 1995 had begun the construction of a factory to produce short-range missiles based on the Chinese M-11 missile design. See, R. Jeffrey Smith, 'China Linked to Pakistani Missile Plant', *Washington Post*, 25 August 1996. This did not lead to U.S. imposition of sanctions on Pakistan. However, in 2001, Washington imposed MCTR Category II sanctions on Pakistani and Chinese entities for

Development Complex (NDC), a subsidiary of Pakistan Atomic Energy Commission. It was first tested in April 1999, although its serial production began in 1998.[13] It was inducted into Pakistan Army's Strategic Forces Command in March 2003.

Hatf-V/Ghauri-I

Ghauri-I is a single-stage, liquid-propellant, road-mobile Intermediate Range Ballistic Missile (IRBM), and has a range of 1300 km with a payload capacity of 680 kg. Pakistan specifically developed the *Ghauri* in response to India's development of the *Prithvi* missile system.[14] This missile was developed in the Khan Research Laboratories (KRL) and its first test took place on 6 April 1998. The *Ghauri-I* has formally been inducted into the Pakistan Army's Strategic Forces Command in January 2003. This missile closely resembles North Korea's *Nodong* missile, and it is widely believed that Pakistan obtained the design and technologies to build this missile system from North Korea in the early 1990s in exchange for its assistance to the DPRK's clandestine uranium enrichment programme.[15]

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trading sensitive dual-use technologies. See, Amir Mateen, 'New U.S. Sanctions on China, Pakistan', *The News*, 2 September 2001. These sanctions were lifted following the terrorist attacks on World Trade Centre on 11 September 2001 when Pakistan emerged as a frontline state in the US-led war on terror.

[13] *Jane's Defence Weekly*, June 1998, p. 3.

[14] On *Prithvi* missile, see, Federation of American Scientists, 'Prithvi', available at http://www.fas.org/nuke/guide/india/missile/prithvi.htm

[15] In early 1990s, Islamabad assisted North Korea to build its nuclear enrichment programme in exchange for missile design and technology. For details, see Duncan Lennox, "Ballistics Boom", *Jane's Defence Weekly*, (vol. 32, no. 10, 8 September 1999), p. 31; Chaim Braun and Christopher F. Chyba, "Proliferation Rings: New Challenges to the Nuclear Nonproliferation Regime," *International Security*, (vol. 29, no. 2, 2004); Joseph Bermudez, "A silent partner," *Jane's Defence Weekly*, (vol. 29, no. 20, 20 May 1998), pp. 16-17; Gaurav Kampani, 'Second Tier Proliferation: The Case of Pakistan and North Korea', *The Nonproliferation Review*, (vol. 9, issue 3, Fall/Winter 2002); Carnegie Endowment for International Peace, "Pakistan and North Korea", *Strategic Comments*, (vol. 8, issue 9, November 2002), available at http://www.carnegieendowment.org/pdf/npp/Pakistan%20and%20North%20Korea.pdf

Hatf-VI/Shaheen-II

Shaheen-II is a road-mobile, two-stage, solid-fuelled ballistic missile system, and an improved version of *Shaheen-I*. It has a maximum range of 2,200 km and is capable of carrying a 1,100 kg payload warhead. Many speculate that *Shaheen-II* has been developed from the design of Chinese M-18 missile system.[16] It is a considerably sophisticated and accurate missile system with a separating re-entry vehicle. Without going for a test-flight, this missile was first displayed during the Pakistan Day Parade on 23 March 2000 and eventually was tested on 9 March 2004.

Ghauri-II

Ghauri-II is an improved version of the original variant of this series *Ghauri-I*. Like *Ghauri-I* it is liquid-propellant, but unlike its predecessor, it is a two-stage IRBM. It has a range of 1800 km and is capable of carrying 1500 kg payload ammunition.[17] Its first flight-test took place on 14 April 1999.

M-11

Pakistan has about three dozens Chinese manufactured M-11 missiles, which Beijing, as noted earlier, supplied in early 1990s. M-11 is a road-mobile, solid-propellant missile system, which has a range of 280-300 km and is capable of carrying a maximum 1200 kg payload munitions.

Hatf-VII/Babar

Babar is a subsonic, low-level terrain-mapping and terrain-hugging cruise missile system. It closely resembles American BGM-109 Tomahawk cruise missile.[18] This missile has been developed as part of *Hatf* series (*Hatf-VII*), and has a range of 500 km. Its first flight test took

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[16] 'Shaheen-II/Hatf-6/Ghaznavi - Pakistan Missile Weapons Delivery Systems', *Federation of American Scientists*, available at http://www.fas.org/nuke/guide/pakistan/missile/shaheen-2.htm

[17] Ben Sheppard, "Regional Rivalries are Replayed as India and Pakistan Renew Ballistic Missile Tests", *Jane's International Defence Review*, 5/1999, p. 57.

[18] "Hatf 7, Babar Cruise Missile", available at http://www.pakistanidefence.com/Nuclear&Missiles/BaburCruiseMissile_info.htm

place on 12 August 2005. With modifications, it may be possible to launch this missile from ships, submarines, and aircrafts. Islamabad probably has undertaken a new project to upgrade the *Babar* and develop a new variant of this missile system (*Babar-2*) that will increase its range and payload. Serial production of the original variant of *Babar* began in October 2005.

Hatf-VIII/Raad

It is an 'Air Launch Cruise Missile' (ALCM) with a range of 350 km and can carry varied payload munitions. According to Pakistan military sources, the "Raad can carry all types of warheads and has accuracy comparable to Pakistan's longer Babar cruise missile,"[19]

Dynamics of Pakistan's Missile Capability Build-Up: Origin and Evolution

In absence of any authentic government source materials, it is difficult to be certain about when the Pakistani authorities began to pay serious attention to develop the country's missile capabilities or when it actually launched a missile development programme.[20] However, activities surrounding the country's space programme in the early 1980s indicate that Islamabad probably at that point realised the necessity of building missile capabilities. In 1981, while elaborating a 10-year national space programme, Salim Mahmood, chairperson of Pakistan Space and Upper Atmospheric Research Commission (SUPARCO), pointed out that the government had been studying in detail the configuration of a satellite which could "serve strategic purposes by taking pictures of military installations, army movements and acting as control, command and communication bases."[21] It is noteworthy that

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[19] "Pakistan tests new cruise missile," BBC News, 25 August 2007, available at http://news.bbc.co.uk/1/hi/world/south_asia/6963768.stm.

[20] Although its authenticity remains doubtful, but at least one source claims that Pakistan's early generation missile development programme that produced *Hatf-1* and *Hatf-II* missiles began in 1980. See, 'Pakistan's Missile Program Chronology', available at http://www.pakistanidefence.com/Nuclear&Missiles/Missile_Program_Chronology.html.

[21] B. Radhakrishnan Rao, "Pakistan's Space Ambitions: a military option?", *Nature*, (vol. 294, 10 December 1981), p. 507.

SUPARCO came into being in 1981 against the backdrop of India's flight-testing of SLV-3 in July 1980 and the widespread concern it generated in Pakistan due to the possibility that New Delhi might use it for the development of strategic missiles.[22] The Pakistani Government paid considerable attention to the works of SUPARCO. The fact that President Zia-ul Haq himself headed the organisation was a clear indication that the government was prioritising its works.

Notwithstanding the growing awareness about the necessity of building missile capabilities, within the Pakistani military, political and bureaucratic circles, there was, however, a conspicuous lack of seriousness in pursuing a missile development programme in the early 1980s. Shortage of appropriate technologies, bureaucratic complexity, unavailability of fund, and lack of political commitment were presumably responsible for this. Hence, Pakistan made little progress during the initial phase of its missile development.

From the mid-1980s onward, Islamabad geared up its missile development activities. A number of factors prompted Islamabad to be serious about the development of its own strategic missiles. First of all, Pakistan's missile development programme was a natural corollary of its nuclear weapons programme. It is only natural for a state to seek suitable delivery vehicles when it possesses nuclear weapons. Pakistan launched its strategic weapons programme in the early 1970s and by the mid-1980s it was on the threshold of acquiring the ability to build nuclear weapons.[23] At that point the Pakistani defence planners clearly realised that sooner or later Pakistan would have to develop missile capabilities as a safe and more reliable means of delivering nuclear warheads other than aircrafts.

Moreover, during the Afghan War in the 1980s, Pakistan became exposed to missile threat from the Soviet Union as the Soviet forces fired Scud missiles across the Durand Line targeting the Mujaheeden bases and training camps inside the Pakistani territory.[24] It influenced the

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[22] *Ibid.*

[23] For more exposition on Pakistan's nuclear weapons development, see Bhumitra Chakma, "Road to Chagai: Pakistan's Nuclear Programme, Its Sources and Motivations," *Modern Asian Studies*, (vol. 36, no. 4, October 2002), pp. 871-912.

[24] Naeem Ahmad Salik, "Missile Issues in South Asia", *The Nonproliferation Review*, (vol. 9, no. 2, Summer 2002), p. 50.

Pakistani strategic thinking about missiles, which was subsequently translated into pro-active missile development activities in the late 1980s. Additionally, the demonstration effect of ballistic missiles in the Iran-Iraq war (1980-1988)[25] and general missile proliferation in the developing world in the 1980s also made considerable impact on the Pakistani thinking about the necessity of building missile delivery systems.

But, the decisive impetus to Pakistan's missile programme came from its chief strategic rival, India. New Delhi launched a comprehensive missile development project, known as the Integrated Guided Missile Development Program (IGMDP), in July 1983.[26] It was the most ambitious and by far the largest missile development project India ever had undertaken which, very alarmingly from the Pakistani standpoint, made New Delhi's intention of building a nuclear-capable missile force very clear.[27] Islamabad could not but be concerned that if materialised the IGMDP could drastically alter the military balance between the two countries. Specifically, the plan to develop the *Agni* missile system clearly signalled a nuclear-orientation of India's project, because for only conventional use the development of *Agni* had little sense. Even the inclusion of the *Prithvi*-type missile system raised questions about India's intentions. As a retired Indian military officer has observed, "*Prithvi's* potential as a decisive weapon of war is not when it carries conventional munitions load, but when tipped with a nuclear device".[28] New Delhi's announcement of the IGMDP was closely observed by Islamabad and its strategic implications were carefully assessed by the Pakistanis. In general it was viewed that India was determined to build a

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[25] This point is discussed by defence analyst Rodney W. Jones, "Pakistan's Nuclear Posture: Arms Race Instabilities in South Asia", *Asian Affairs*, (vol. 25, no. 2, Summer 1998), p. 71.

[26] On the launching of the IGMDP and the development of India's missile capabilities, see, Anupam Srivastava, "India's Growing Missile Ambitions: Assessing the Technical and Strategic Dimensions", *Asian Survey*, (vol. XL, no. 2, March-April 2000), pp. 311-341.

[27] A leading Indian strategic analyst, K. Subrahmanyam, has maintained that the IGMDP made it clear that 'India was aiming at developing its nuclear option further.' See, K. Subrahmanyam, "India's Nuclear Policy – 1964-1998", in Jasjit Singh, (ed.), *Nuclear India*, (New Delhi: Knowledge World, 1998), p. 39.

[28] Lieutenant General (Retd.) Harwant Singh, quoted in George Perkovich, *India's Nuclear Bomb*, (Berkeley: University of California Press, 1999), p. 296.

nuclear arsenal and a compatible missile force. No wonder then that in reaction Islamabad geared up, *albeit* clandestinely, it's *Hatf-I* and *Hatf-II* missile projects.

India, following the launching of the IGMDP, quickly developed the *Prithvi* and *Agni* missile systems and tested them in 1988 and 1989 respectively. Those tests reinforced Pakistani resolve to expeditiously build a countervailing missile force. In particular, India's testing of the *Prithvi* missile on 18 February 1988, which is generally considered to be Pakistan-specific, made a critical impact on the Pakistan strategic calculation. It not only expedited Pakistan's missile development endeavour, it also forced Islamabad to foster secret links with friendly countries, such as China and North Korea, in order to expeditiously build its missile capabilities. Pakistan's sustained effort soon bore fruit, which can be observed in its development and testing of *Hatf-I* and *Hatf-II* in early 1989. When asked why Pakistan was developing ballistic missiles, Pakistan's then Minister of State for Defence, Ghulam Sarwar Cheema, replied that Pakistan needed "to have an antidote for what our enemy (India) next door has."[29]

Because of a weak industrial and technological base, Pakistan was to a large extent dependent on the supply of relevant technologies from external sources to build its missiles. From the outset, however, Islamabad confronted a hostile international environment, which severely impeded the expeditious development of its missile capabilities. For one thing, Islamabad was already widely suspected for pursuing a clandestine nuclear weapons programme and was under severe pressure from the West, in particular the USA, to abandon its nuclear weapons ambition. Washington imposed sanctions on Pakistan in 1979 for clandestine procurement of uranium enrichment technologies which violated the Glenn-Symington Amendment.[30] Pakistan, therefore, was under the close watch of the West, and was included as a target country in the Nuclear

[29] Roger Fronst, "Pakistan's New Defence Minister on Missiles, Sefl-reliance and Afghanistan", *International Defence Review*, April 1989.

[30] In 1976 and 1977, the US Congress enacted the Glenn/Symington amendment to the Foreign Assistance Act, which provided that countries importing or exporting sensitive dual-use technologies under certain conditions would be cut off from US economic and military assistance.

Suppliers' Group's (NSG) so-called trigger list.[31] Additionally, the creation of the Missile Technology Control Regime (MTCR) in 1987 came as a crippling blow to Islamabad's quest for missile technologies from the international market. Such a hostile international environment, on the one hand, and the strategic necessity of quickly building missile capabilities, on the other, forced Islamabad to use clandestine means to procure missile technologies. It was in this context that Islamabad fostered secret links with Beijing and Pyongyang.

On 25 April 1988, the Pakistani Government claimed that it had launched an 800 km range ballistic missile.[32] It raised eyebrows amongst observers about Islamabad's claim as at that stage it was practically not feasible for Pakistan to build a missile of such range. No independent source is available to verify the Pakistani claim. However, it did highlight the Pakistani concern regarding India's *Prithvi* missile and Islamabad's desperate attempt to acquire a countervailing missile force. Indeed, the Pakistani government indicated that this missile system was developed to counter India's growing missile capability.[33] In early 1989, Pakistan test-fired a 150 kg multi-stage rocket at an altitude of 640 kilometres, which was soon followed by the testing of short-range, solid propellant, *Hatf-I* and *Hatf-II* missiles. China provided, as noted earlier, vital assistance to Islamabad to develop these two missile systems. Following the test of *Hatf-I* and *Hatf-II*, Pakistan embarked upon building longer-range missiles, which was prompted by the necessity that Pakistan was still short of a missile capability that could hit New Delhi. It is noteworthy that neither *Hatf-I* nor *Hatf-II* had a range that could strike the Indian capital. Not surprisingly, then, that Islamabad undertook new missile projects and expeditiously pursued them. Pakistan's then Chief of Army Staff General Mirza Aslam Beg stated that Pakistan had embarked on a new project to develop a missile with a range of 600 km that would enable his country to strike New Delhi.[34]

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[31] The Nuclear Suppliers Group was formed in 1975 by industrialised countries in reaction to India's 1974 nuclear test. Its primary objective was to control export of dual-use sensitive technologies. The 'trigger list' is the guideline for the transfer of nuclear material, equipment and technology.

[32] Institute of Regional Studies (Islamabad), "Missile Proliferation in South Asia", *Spotlight on Regional Affairs*, (vol. IX, no. 1 January 1990).

[33] *Ibid.*

[34] Mushahid Hussain, "Pakistan 'responding to change'," *Jane's Defence Weekly*, (vol. 12, no. 15, 14 October 1989), p. 779.

In 1989, Islamabad concluded a secret deal with Beijing to purchase 34 solid-propellant M-11 ballistic missiles.[35] It resulted from Islamabad's frantic effort to build missile capabilities to counter India's growing missile power and was catalysed by two specific factors: (1) a hostile international environment created by the formation of the NSG and the MCTR, which made the procurement of relevant technologies from open international sources for developing missiles very difficult; and (2) the test of Pakistan-specific *Prithvi* missile in 1988 and *Agni* in 1989, which made, as discussed above, huge impact on Pakistan's missile building priorities. In addition to supplying M-11, Beijing also assisted Pakistan in building an indigenous capability to manufacture missiles. The *Washington Post*, citing US intelligence sources, reported that China had not only sold manufactured M-11 solid-fuel missile to Pakistan in the early 1990s, it had also transferred to Pakistan the production technology for a solid-fuel ballistic missile manufacturing plant.[36]

Islamabad also established secret link with Pyongyang as another source of missile technology. It is unknown how and when this link was established or who – Zia-ul Haq or Benazir Bhutto – took this initiative. It is, however, evident that after becoming Prime Minister in December 1988, Benazir Bhutto gave her full support to the missile programme and did everything to expedite the country's missile capability. Reportedly Pakistani officials visited DPRK's Sanum-dong Missile Development Centre in late 1980s to examine the *Nodong* missile. In July 1992, North Korean Deputy Premier and Foreign Minister Kim Yong-nam visited Islamabad and discussed issues pertaining to missile cooperation and his country's sale of *Nodong* missiles to Pakistan. In May 1993, Pakistani scientists and engineers attended a test launch of the *Nodong* in North Korea. Prime Minister Benazir Bhutto herself visited Pyongyang on 30 December 1993, which probably was a turning point in the Pakistan-DPRK collaboration in the missile and nuclear fields. It is widely speculated that a 'missile for nuclear technology' deal was negotiated during her visit.

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[35] Carnegie Endowment for International Peace, "Pakistan and North Korea", *Strategic Comments*, (vol. 8, issue 9, November 2002), p. 1, available at http://www.carnegieendowment.org/pdf/npp/Pakistan%20and%20North%20Korea.pdf

[36] R. Jeffrey Smith, "Reports Cite China-Pakistan Missile Links", *The Washington Post*, 13 June 1996.

This was followed by a visit a few months later of a delegation led by the head of the Khan Research Laboratories, A.Q. Khan. This is not very clear what the primary objective of Khan's visit was or whether he discussed about the barter deal. However, evidence suggests that further negotiations were conducted during a visit of Marshall Ch'oe Gwang, former vice-chairperson of North Korea's National Defence Commission, to Islamabad in late 1995.[37] Possibly a barter deal was at a final stage of negotiations at that time. Interestingly, the Chief of Army Staff Jahangir Karamat also paid a visit, albeit secretly, to Pyongyang in December 1997, which highlighted the development of a strategic partnership between the two countries.[38]

The end of the Cold War and the emergence of a new international environment made Pakistan strategically more vulnerable than before, which reinforced Pakistan's sense of urgency to develop a robust nuclear deterrent capability and a compatible missile delivery force. In an altered post-Cold War international environment, Washington not only withdrew its patronage, it also emerged as a 'nuclear watchdog' in its relations with Pakistan, which was reflected in Washington's imposition of sanctions on Pakistan in 1990 applying the Pressler Amendment.[39] It

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[37] Carnegie Endowment for International Peace, "Pakistan and North Korea", *Strategic Comments*, (vol. 8, issue 9, November 2002), p. 1, available at http://www.carnegieendowment.org/pdf/npp/Pakistan%20and%20North%20Korea.pdf

[38] John Lancaster and Kamran Khan, "Musharraf Named in Nuclear Probe: Senior Pakistani Army Officers were Aware of Technology Transfers, Scientist Says", *Washington Post*, 3 February 2004. Benazir Bhutto herself has acknowledged that Pakistan had paid North Korea in cash for the transfer of missile technology during her second term in 1994-1996, although that did not involve any missiles or missile technology. See, "Bhutto Says Pak Paid N Korea for Missile Tech", *The Economic Times* (Mumbai), 11 February 2004; Anwar Iqbal, "Exclusive: Bhutto on Pakistan Nuclear History", *United Press International*, 13 April 2004.

[39] The Pressler Amendment, named after Senator Larry Pressler who tabled the bill, is a Pakistan-specific anti-proliferation legislation enacted by the US Congress in 1985. This legislation was designed to cut off US aid and government-to-government military sales to Pakistan unless the President certified at the beginning of each fiscal year that Pakistan did not "possess a nuclear explosive device and that the proposed U.S. assistance programme will significantly reduce the risk that Pakistan will possess a nuclear explosive device." From 1985 to 1989 President Reagan and President Bush certified every year that Pakistan did not possess a

should be noted that Pakistan enjoyed unprecedented geopolitical weight in the 1980s as a frontline state in the Afghan War and Washington waived the application of Pressler Amendment in the latter half of the decade. This sense of security vulnerability again sharpened when a crisis over Kashmir erupted in 1990, which had a nuclear connotation.[40] Reportedly Pakistan modified American-supplied F-16 aircraft for possible nuclear delivery.[41] Islamabad's deepening of strategic collaboration with Beijing and Pyongyang and its effort to build missile capabilities should be seen in the context of new strategic environment that emerged after the end of the Cold War.

In June 1997, press reports suggested that the Army version of Indian short range *Prithvi* missiles had been deployed in Jullundur, an area which is very close to the Indo-Pakistani border.[42] New Delhi denied the 'deployment' of *Prithvi* missiles, but said a batch of missiles had merely been moved from its production facilities in South India to the north. Responding to this development, Pakistan tested a nuclear capable missile *Hatf-III*, which essentially highlighted Islamabad's determination to match India's expanding missile capabilities.[43]

Pakistan developed the liquid-propellant, road-mobile *Ghauri* (*Hatf-V*), with an estimated range of 1,300 km and a payload capacity of 680 kg to counter India's *Prithvi* missile. According to Pakistani officials: "the *Ghauri* compensates for Pakistan's lack of strategic depth.... [it] serves the strategic need of Pakistan to be able to hold India in a position

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nuclear explosive device in order to facilitate military and economic aid to that country. They did so despite strong evidence that Pakistan was making significant advances in acquiring nuclear weapons capability.

[40] On the 1990 Kashmir crisis, see, Devin T. Hagerty, "Nuclear Deterrence in South Asia: The 1990 Indo-Pakistani Crisis", *International Security*, (vol. 20, no. 3, Winter 1995/96), pp. 79-114.

[41] Pervaiz Hoodbhoy, "Nuclear Deterrence – An Article of Faith", *The News*, 17 March 1993.

[42] R. Jeffrey Smith, "India Moves Missiles to Near Pakistan Border", *The Washington Post*, 3 June 1997. There are two versions of the Prithvi missile system. The Army version with a 1,000-kilogram payload has a range of up to 150 kilometres. The air force version with a lighter 500-kilogram payload has a range of up to 250 kilometres and can reach all important cities and Army bases in Northern Pakistan.

[43] "Hataf III Test", *The Nation*, 6 July 1997.

of vulnerability similar to itself."[44] Pakistan also developed a solid-fuel missile system *Shaheen-I* (*Hatf-IV*) and tested it on 15 April 1999. Pakistan's President Farooq Ahmed Leghari maintained that Pakistan was compelled to join a missile race with India since the *Prithvi* and other Indian missiles constituted a lethal threat to Pakistan's own security.[45]

Pakistan has continued to upgrade its missiles following the May 1998 nuclear tests. Pakistan developed a new variant of Ghauri missile, Ghauri-II, and tested it on 14 April 1999. It also conducted flight test of the *Shaheen-1* (*Hatf-IV*) on 15 April 1999. Pakistani officials stated that the flight test of *Ghauri-II* and *Shaheen-I* would ensure that Pakistan's 'minimum deterrent capability' was technically credible and it would maintain 'strategic balance in South Asia'.[46]

Following these tests, Islamabad halted missile test 'for now' and called on New Delhi to join in a 'strategic restraint regime' in order to limit the development of missile and nuclear weapons technology and deployment.[47] Pakistan observed the self-imposed moratorium on missile testing for the next three years and in fact did not respond to India's test of *Agni-II* in January 2001 or *Dhanush* in September 2001 with any missile test of its own. Pakistan resumed missile testing in May 2002 against the backdrop of a military stand-off with India. This crisis erupted as India mobilised its troops along the Indo-Pakistani border in response to the terrorist attack on the Indian Parliament in December 2001, allegedly carried out by Pakistani-based terrorist organisations. The Pakistani missile test was a clear deterrent signal during the stand-off.[48] Islamabad inducted the *Ghauri* missile into the Army's Strategic Forces Command in January 2003. Senior Pakistani officials claimed that

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[44] Umer Farooq, "Pakistan ready to arm Ghauri with warheads", *Jane's Defence Weekly*, (vol. 29, no. 22, 3 June 1998), p. 4.

[45] *The Nation*, 1 June 1995. Pakistan's President again expressed his extreme concern about India's *Prithvi* missile threat after India conducted *Prithvi-II* flight-testing in January 1996. See, *The Pakistan Times*, 3 February 1996.

[46] Umer Farooq, "Pakistan's Ghauri Test for 'national security", *Jane's Defence Weekly*, (vol. 31, no. 16, 21 April 1999), p. 3.

[47] U.S. Department of Defense, *Proliferation: Threat and Response*, January 2001, p. 30; available at http://www.fas.org/irp/threat/prolif00.pdf

[48] Rahul Roy-Chaudhury, "Nuclear Doctrine, Declaratory Policy, and Escalation Control," in Michael Krepon, Rodney W. Jones, and Ziad Haider, eds., *Escalation Control and Nuclear Option in South Asia*, (Washington, D.C.: The Henry L. Stimson Center, 2004).

the decision to induct the *Ghauri* into the Army was a response to India's decision to induct short-range ballistic missiles into its military.[49]

Although various factors accounted for Pakistan's missile procurement and development approach since it started its missile build-up programme in the 1980s, the strongest impetus for its missile acquisition came from the strategic necessity of defending itself against the perceived threat of its traditional security rival, India. Starting in the 1980s, Pakistan today has built a robust missiles force. Pakistan's missile programme, some consider, is more advanced than India's.[50]

Strategic Implications of Pakistani Missiles

Ballistic missiles can attack distant targets with great rapidity and considerable accuracy, and, hence, they possess great ability to penetrate adversary's defensive systems. For first, retaliatory, or surprise attack there is in fact no comparable delivery vehicle to that of ballistic missile. Once it is launched virtually delivery of munitions is assured. Because of its assured delivery capability, introduction of ballistic missile makes great strategic impact.

Three issues need to be taken into account for assessing strategic implications of Pakistani missiles: first, its implications for, and impact on, Pakistan-India deterrence stability; second, its impact on crisis stability in the volatile and crisis-prone South Asia region; and third, the role of missiles in conflict escalation and intra-war deterrence in the case of a conflict.

Deterrence Stability

The central question regarding the implications of Pakistan's missile power on deterrence stability is whether it enhances Pakistan's nuclear deterrent capability that stabilises strategic relations between itself and India or whether it upsets the existing strategic balance resulting in strategic instability.

Islamabad has built, as discussed earlier, a formidable missile force comprising a variety of systems that can deliver varied payload nuclear warheads at different targets inside India. Presumably, they equip

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[49] "Command Structures Watertight: Musharraf: Hatf-5 given to army", *Dawn*, 9 January 2003.
[50] Cirincione, *Deadly Arsenal*, *op. cit.*, p. 214.

Pakistan with an ability to inflict 'unacceptable damage' on India, meaning that Islamabad has acquired a robust deterrent capability against its chief strategic adversary. According to a senior Pakistani military official, the *Ghauri* missiles are earmarked for first-strike 'offensive' operations, while the *Shaheen* missiles are reserved for 'defensive' second-strike purposes.[51] The Rumsfeld Commission Report also noted that Pakistan had acquired an ability which had put 'all of India within range of Pakistani missiles.'[52]

Islamabad pursues a strategy of 'minimum nuclear deterrence', which implies that it has built or intends to build a small, *albeit* credible, nuclear arsenal. It also means that Pakistan needs such a missile force which is compatible with this strategy but sufficient enough for its nuclear deterrence. At a cursory glance, nuclear deterrence since the advent of nuclear weapons in the region has generally functioned in South Asia and has prevented any outbreak of major wars.[53] Since the May 1998 nuclear tests, Pakistan and India have fought a 'limited war' in Kashmir (Kargil War) and have gone through a major military stand-off in 2001-02. From the experience of these two engagements, one can advance this argument that the Pakistani missile force is considerably efficacious and robust, and in general contributes to deterrence stability in South Asia region. The Kargil War remained 'limited' because of the possession of nuclear weapons by both India and Pakistan and in the same vein, nuclear weapons helped to de-escalate the 2001-02 stand-off.

However, at another level, it is also arguable that the advent of nuclear weapons and the building of compatible missile force by both India and Pakistan may have made war 'irrational', but it has not made

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[51] Quoted Waheguru Pal Singh Sidhu, "The Implications for Postures and Capabilities in South Asia", *Special Joint Series on Missile Issues*, Occasional Paper No. 7, *International Perspectives on Missile Proliferation and Defenses*, Centre for Non-proliferation Studies (Monterey) and the Mountbatten Centre for International Studies (Southampton), May 2001, p. 62; available at http://cns.miis.edu/pubs/opapers/op7/op7.pdf.

[52] Executive Summary of the Rumsfeld Commission Report, available at http://www.fas.org/irp/threat/missile/rumsfeldexecsum.htm

[53] For a detailed assessment of pre-tests South Asian nuclear deterrence system, see, Devin T. Hagerty, *The Consequences of Nuclear Proliferation: Lessons from South Asia* (Cambridge, Mass.: MIT Press, 1998); On post-tests nuclear deterrence, see Michael Quinlan, 'India-Pakistan Deterrence Revisited', *Survival*, (vol. 47, no. 3, Autumn 2005), pp. 103-116.

war impossible. The Kargil War under the nuclear shadow between the two nuclear rivals is a case in point. Nuclear weapons may be a deterrence stabiliser. Paradoxically, they also may be 'risk maximiser', thereby creating instability in a nuclear environment. The situation is, thus, known in strategic literature as 'stability-instability' paradox.[54] From this perspective, possession of nuclear weapons and reliable delivery systems has made both India and Pakistan complacent and relaxed in strategic assessment and substantively prone to take risk and play the game of brinkmanship. Arguably, the 1999 Kargil War resulted from such a risk-taking tendency. Similarly, the 2001-02 military stand-off resulted from such an Indian attitude. As the lethality and sophistication of the South Asian missiles will grow this risk-taking tendency of Pakistan and India may increase even further. Therefore, in this sense, missiles have made the Pakistan-India relation below the strategic threshold rather inherently unstable.

Missiles are not necessarily de-stabiliser. They operate in the context of overall military capability of a state and they may be strategic stabiliser if deployed or employed judiciously in a strategic manner and if it's military and political context is put in the right perspective. Therefore, robust missile capabilities and defensive measures to ensure the survival of the missile force against an enemy attack may contribute to deterrence stability. The measures for ensuring survival of missiles may include the hardening of missile storage sites, dispersal of missiles, and building of ATBMs, etc. Defensive measures generally make first-strike and counter-military strike difficult, which reinforce deterrence stability.

Crisis Stability

Crisis stability is defined as a situation 'in which neither side can expect a lasting profit by actually initiating war.'[55] It functions when a general power balance in offensive and defensive forces exists, but is undermined if a country acquires a capability of rapid penetration into

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[54] On stability-instability paradox, see, Glenn H. Snyder, "The Balance of Power and the Balance of Terror," in Paul Seabury, (ed.), *The Balance of Power*, (Scranton: Chandler, 1965), pp. 185-201.

[55] Lawrence Freedman, *Arms Control Management or Reform?*, Chatham House Paper, (no. 31, London: Routledge Kegan Paul; Royal Institute of International Affairs, 1986), p. 6.

enemy defences and actually undertakes attack. Of course, it is not only the weapon systems and technologies that matter in holding or undermining crisis stability, the political context also critically weighs in the equation. In South Asian context, the primary question that needs to be considered is whether and how the introduction of missiles and their increasing sophistication undermine or contribute to crisis stability.

Incentives for and the likelihood of undertaking a pre-emptive strike by a party in a given context is a primary cause of strategic instability. A state may be strongly tempted to carry out pre-emptive strike in a crisis situation for a number of reasons. Firstly, a pre-emptive attack is likely if a state calculates to gain 'lasting profit' from a first strike by disarming the adversary and reducing the likelihood of a retaliatory strike. This is more likely to occur when substantive military imbalance does exist between the adversaries or a particular weapon system may be decisive in disarming the opponent in the first strike. Secondly, when a state possesses limited military capabilities, and specifically lacks retaliatory power (second strike capability), it is more likely to undertake a pre-emptive strike. Thirdly, in an environment of acute crisis states always fear that the opponent may carry out the first strike. In order to limit the damage from such an attack, a state may be seriously tempted to hit first. Fourthly, a state may undertake a pre-emptive strike due to the fear that the enemy may deliberately escalate the conflict. When military capability favours a state to acquire 'escalation dominance' in a crisis, first strike becomes a real possibility.

Do Pakistani (and for that matter Indian) missiles affect its strategic calculations in a way that may provoke it to undertake pre-emptive strike or escalate crisis? Although Pakistan has built a robust missile force, Pakistani missiles certainly have not become such decisive weapons that may tempt Islamabad to undertake disarming first strike against India. Nor Islamabad has acquired the ability to have 'escalation dominance'. In other words, with its missile force it is unlikely that Pakistan may expect to gain 'lasting profit' by first strike or through war escalation. In a future crisis, challenge to crisis stability may derive from the Pakistani temptation of striking first to limit the damage that may cause from a perceived Indian first strike. However, fear of Indian retaliatory strike will moderate this Pakistani temptation.

In the 2001-02 crisis, Pakistan pursued a 'pure deterrence' strategy instead of a strategy of 'escalatory deterrence.' Islamabad pursued 'pure

deterrence' strategy by communicating deterrence signal through missile movement and missile testing during the course of the crisis.[56] Therefore, Pakistani missiles did not play any role as offensive weapons for the initiation of war; instead they were used to de-escalate the crisis. Pakistan is likely to advance similar deterrent posture in future Indo-Pakistani crises.

Escalation and Intra-war Deterrence

The decision for war initiation, escalation, and its conduct may be affected if certain types of offensive weapon systems have the potential to play a decisive role in the outcome of a war. It is not only the weapon systems and the quantity and quality of missiles that matter, other variables, such as political dynamics, general balances of forces, missile-to-target ratios and the development of defensive systems are also important and critically influence decision to initiate wars. And if open hostilities were to erupt, missile may have implications for intra-war deterrence. For example, missiles can be employed for punishment, deterrence or compellence during the course of a conflict which can affect the course of a war.

Again the examples of the 1999 Kargil War and the 2001-2002 military stand-off between India and Pakistan provide important insights in this context. Although missiles were not employed, yet it was not that missiles did not play any role. During the Kargil conflict both India and Pakistan used missiles to realise certain objectives and they played important role in the process of the conflict. Although both Pakistan and India deployed missiles during the Kargil war, they did so to prevent escalation rather than use them for offensive operations. Missiles played a similar role during the 2001-2002 crisis.

Both India and Pakistan readied their missiles tipped with nuclear warheads during both the crises. While "India activated all three types of

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[56] Pakistan tested three missile systems *Ghauri-I*, *Ghaznavi* and *Abdali* in late May 2002 when the military standoff was on its peak. According to a former Pakistan Army officer, the testing of those missiles 'was the most explicit signal by Pakistan of the readiness of its missile-deliverable deterrent during the composite crisis period.' See, Feroz Hassan Khan, "Nuclear Signaling, Missiles, and Escalation Control in South Asia," in Michael Krepon, Rodney W. Jones, and Ziad Haide, *Escalation Control and Nuclear Option in South Asia*, (Washington, D.C.: The Henry L. Stimson Center, 2004), p. 89.

nuclear delivery vehicles and kept them in what is known as Readiness State 3 – meaning that some nuclear bombs would be ready to be mated with the delivery vehicle at short notice" and "DRDO (Defence Research and Development Organisation) scientists headed to where *Prithvi* missiles were deployed and at least four of them were readied for possible nuclear strike. Even an *Agni* missile capable of launching of nuclear warhead was moved to a Western Indian state and kept in a state of readiness," [57] Pakistan also mounted nuclear warheads on its missiles. Washington strongly believed that Islamabad readied missiles for deployment during the course of the conflict.[58]

Pakistani account, however, is that Islamabad did not readied missiles because it could lead to escalation. Pakistani measures and movements of missiles were of defensive in nature for protection or survival of its strategic assets should New Delhi were to undertake pre-emptive strike during the course of the crises. It served to de-escalate conflict on both occasions.

Both the countries tested missiles during the course of the 2001-02 crisis to communicate deterrence signals. New Delhi tested a new version of its *Agni* missile. The test was in general considered to be 'Pakistan-specific'.[59] Pakistan resumed missiles testing in May 2002 ending its three-year old self-imposed moratorium. It tested *Ghauri-I, Ghaznavi and Abdali* in quick successions. The testing of these missiles 'was the most explicit signal by Pakistan of the readiness of its missile-deliverable deterrent during the composite crisis period.'[60] According to International Institute for Strategic Studies (IISS), three probable political messages underscored the Pakistani missile tests: first, they were intended to placate domestic critics; second, to increase pressure on India to refrain from launching military strikes; third, to indicate that

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[57] Raj Chengappa, *Weapons of Peace*, (New Delhi: Harper-Collins, 200), p. 437.
[58] President Clinton's interview, "Avoiding Armageddon," available at http://www.sas.upenn.edu/casi Also, see, Strobe Talbot, *Engaging India: Diplomacy, Democracy and The Bomb*, (Washington, DC: The Brookings Institution, 2004), p. 161.
[59] "Future-Fire – The Shorter Smarter Agni Heralds a New Genre of Missiles Directed Toward Pakistan", *India Today*, 29 January 2002.
[60] Feroz Hassan Khan, *op. cit.*, p. 89.

Pakistan was capable of using short- and intermediate-range ballistic missiles with nuclear warheads and prepared to do so, if required.[61]

Islamabad was also convinced that missile testing effectuated intra-war deterrence and contributed to the de-escalation of the conflict. As President Musharraf explained:

> By testing, with outstanding success, the delivery systems of our strategic capability, these men (scientists) validated the reliability, accuracy, and the deterrence value of Pakistan's premier surface-to-surface ballistic missile systems of the Hatf series, namely Ghauri, Ghaznavi, and Abdali…we need to ensure that the three basic ingredients of the deterrence - capability, credibility and resolve never get compromised.[62]

Pakistani missiles in both cases, therefore, played a critical role as a factor of intra-war deterrence and conflict de-escalation. Pakistan advanced calculative deterrent signals, primarily through the movement of missiles and missile testing, which prevented further escalation of the conflicts. Given that Pakistani missiles were not in any way penetratively decisive delivery vehicles and Islamabad had no intention of war escalation during these crises, therefore it can be concluded that Pakistani missiles did not play an escalatory role rather helped to maintain intra-war deterrence and de-escalate crisis. Indeed, rather than being a factor of escalation, Pakistani missiles played the role of escalation-minimiser.

Conclusion

Pakistan will continue to upgrade its technology for more lighter missiles in order to increase their reliability, efficiency, and accuracy. More tests are expected in the future and more competitive developments of missiles will follow. As nuclear deterrence will be the dominant security discourse in the South Asian environment, Pakistan's missile development will probably continue until it stabilises at a point when Islamabad is assured of obtaining a robust deterrent force.

Pakistani missiles have acted as a factor of deterrence and crisis stability in the strategically volatile South Asia region. It has prevented crisis escalation and contributed to obtain intra-war deterrence. There has

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[61] IISS, *The Military Balance: 2002-2003*, p. 126.
[62] "Nation Proud of Missile Test Results, Musharraf," *The News*, 18 June 2002.

been hardly any indication that missiles have increased its temptation to undertake pre-emptive strike. Therefore, ballistic missiles are not necessarily destabiliser, rather so far have proved to be a factor of strategic stability in South Asia.